ON YOUR RADAR

Executive Summary

Intersoft Electronics is a growing organization in transport, air traffic and defense markets. As an established technology and services provider for Communication, Navigation and Surveillance (CNS), we expand globally, operating from our competence centers and local subsidiaries.

Four decades of analyzing and measuring radar and navaid systems resulted in a broad portfolio of services for ANSPs, manufacturers and military CNS operators. The changing airspace environment and rapidly advancing technology force manufacturers to rethink the way they design air surveillance systems. Modular radar and our patented processing algorithms offer profitable solutions.

Profitability and sustainability are the drivers of our design team. Our customers should be able to perform an excellent job in a competitive way, while reducing the environmental footprint of their activities. The SkyRF® drone-based measurement services for instance, allow to reduce test flights carbon emissions and noise disturbances up to 50%.

In this publication, we introduce our portfolio highlights, the core activities and some corporate facts and figures. Enjoy it and get in touch with us if you too want to make the sky safer.

Luc Switten,
CEO Intersoft Electronics Group

PORTFOLIO HIGHLIGHTS

- ASR-M® Modular ASR
- Non-Rotating Antenna Solutions
- Naval Applications
- RASS® Measurement Equipment
- SkyRF® Drone Measurement Services

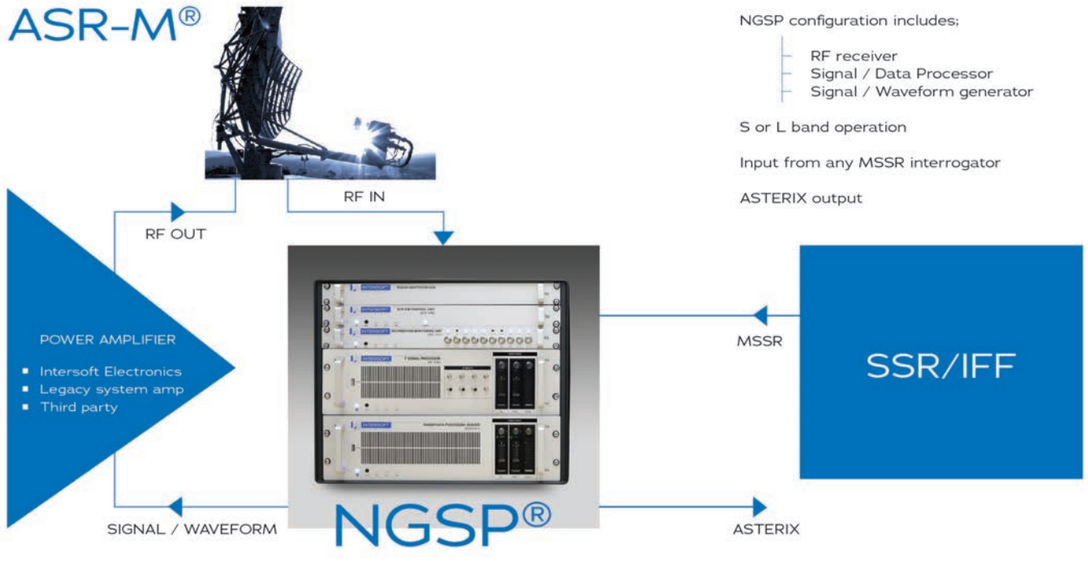
ASR-M®

A modular ASR design for infinite system lifetime

Replacing legacy electronics radar shelters with new monolith systems doesn't work any longer in a world with rapidly changing technologies. Technological advances in radar design are driven by new challenges in National Airspace (NAS) environments. Windfarms and interference from 4G/5G mobile phone base stations are emerging issues that require smart signal processing algorithms to mitigate them.

While new technologies to address those challenges become available, the NAS keeps on changing. Signal processing technologies must continue to evolve to properly detect aircraft with different characteristics in complex environments. It's impossible to keep an ASR system on track with the required advancing technologies while applying full system replacement programs every 20 year.

ASR-M® is a modular approach to Airport Surveillance Radar that allows manufacturers to integrate a system that is agile by design. Hardware modules can be replaced as Line Replacement Units (LRU's) and software blocks can be updated from a remote location. The modular design allows to configure the same hardware for completely different functions. ASR-M® remains state-of-the-art throughout its lifetime.

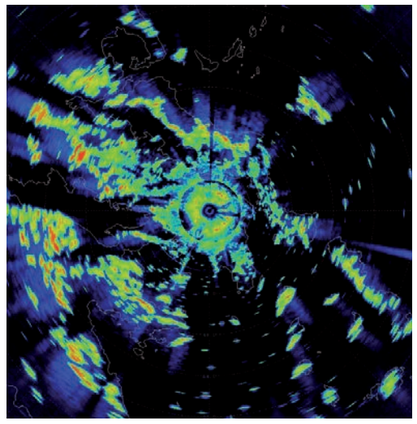


Advanced processing algorithms

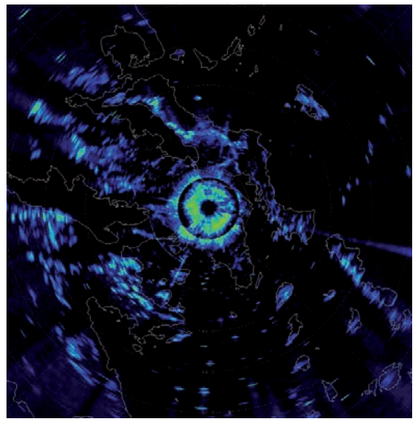
ASR-M® incorporates patented algorithms that address the emerging challenges of changing NAS environments. Ground clutter cancellation, windfarm mitigation and interference suppression are processed in an unrivalled way.

True 3D height

ASR-M® also features 3D processing. Height information from PSR's increases the rejection efficiency of false targets and in addition provides a significant operational advantage as it is possible to report the height of targets with a malfunctioning or disabled transponder.



before Clutter Cancellation



after Clutter Cancellation

Non-Rotating Antenna Solutions

A game changer in radar system integration, performance and maintenance

Non-rotating antenna technologies have been around for some time, but mainly as the preserve of expensive military radar systems. Intersoft is developing novel non-rotating antenna technologies, which provide some of the advanced capabilities of these military systems for the civil radar market, but at a competitive cost point.

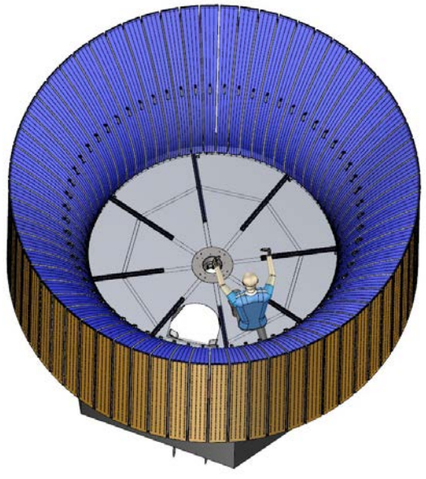
The Intersoft non-rotating antenna concept is based on a circular array, rather than the more common multi-faced planar (flat) arrays. This results in less beam degradation when the electronically scanned beam is pointed off the antenna boresight, maintaining near equal performance at all scan angles.

Intersoft Electronics is developing non-rotating antenna technologies for S-Band and L-Band primary radar and L-band SSR/IFF.

S-ESAM® - The Modular S-band Electronic Scanning Array

S-ESAM® is the novel circular array design for S-band PSR. Integrated with the non-rotating array is a distributed transmitter/receive amplifier subsystem. This integration virtually eliminates feeder losses between the normally centralized and remote transmitter and receiver electronics. This results in less total transmitter power being required to achieve the same performance as a conventional airport surveillance radar with many times higher transmitter power output.

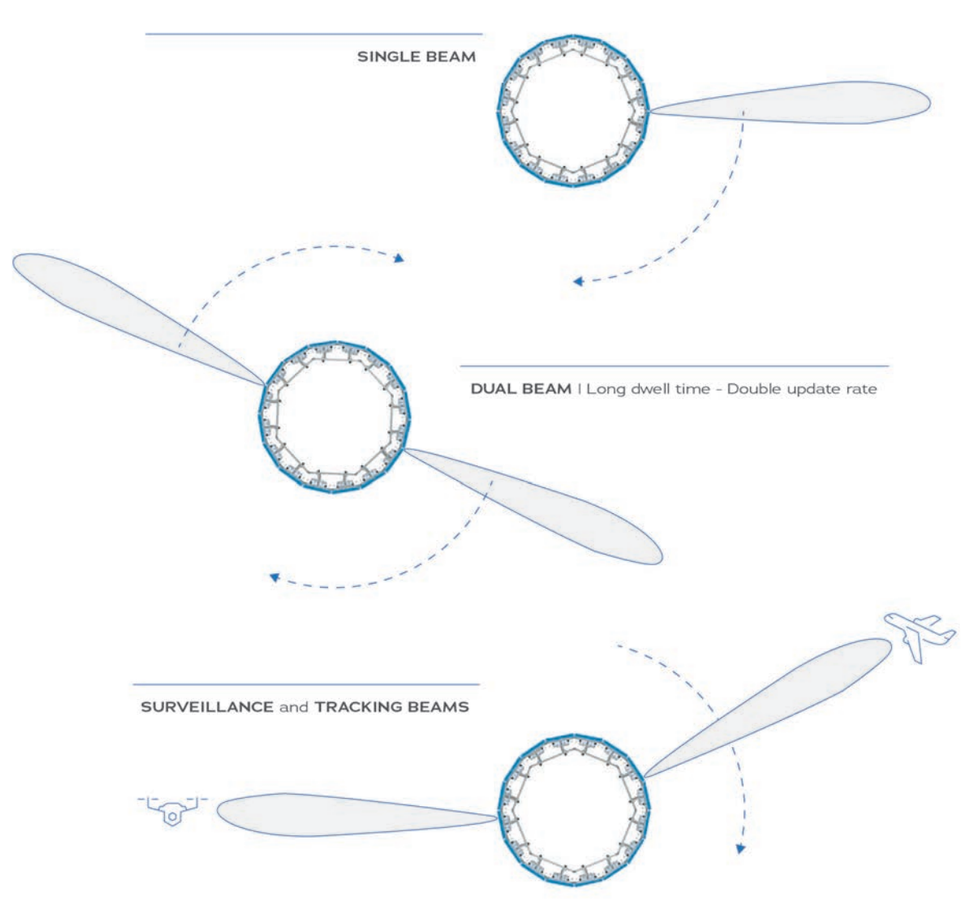
Due to the modular construction, the arrays are scalable in diameter giving a choice in antenna aperture and total transmit power.



Multiple simultaneous beams

The Intersoft Electronics non-rotating antenna technologies can have multiple simultaneous beams. This allows for additional concepts of operation with specific benefits:

- Double the dwell time while maintaining the update interval for increased detection capability
- Increase the update rate with back-to-back surveillance beams
- Having a single surveillance beam and a second ‘tracking’ beam with the ability to have much more time-on-target



Naval applications

Non-rotating L-IESA® IFF antenna subsystems for ships

L-IESA® IFF is the non-rotating IFF antenna system, that can be interfaced with any SSR or STANAG/AIMS certified IFF interrogator. It features unique electronic leveling capabilities that improve detection performance and volume coverage of ship-born IFF.

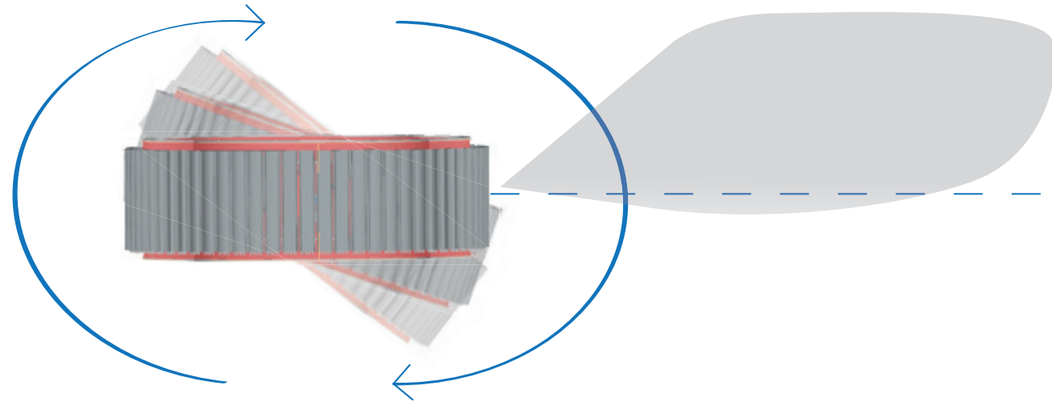
The circular design and the application of innovative power handling technologies allow L-IESA® IFF to overcome long lasting challenges in antenna system design and integration. As such, L-IESA® IFF not only brings value to the owner and operator, but also to the integrator.

The platform space on a ship is often limited to the mast, and every Communication, Navigation and Surveillance (CNS) system claims the top position. The circular design of L-IESA® IFF turns out to be very convenient because it can simply be wrapped around the mast, ensuring 360-degree coverage while leaving the top position vacant for other CNS systems.

The L-IESA® IFF does not contain any rotating parts, which improves its maintainability and reduces life cycle cost.

Electronic leveling

To improve its volume coverage in case of strong ship movements, the L-IESA® IFF is using its unique Vertical Antenna Pointing Diversity (VAPD), an electronic elevation beam steering and leveling.This corrects rolling ship movements in real-time and results in improved detection performance, even in case of rough sea.



RASS®

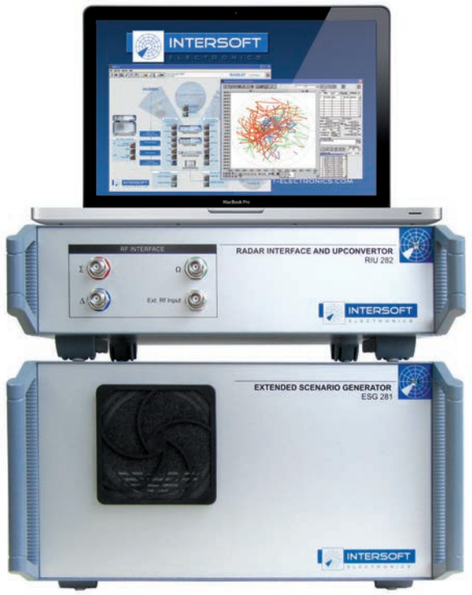
Radar Analysis Support System

RASS® comprises a set of test equipment for CNS performance analysis. Different tools are available for different levels of analysis, on-site and in-factory. RASS® can be used for daily system performance monitoring and maintenance, as well as for product development, calibration and certification.

RES®– Radar Environment Simulation for SSR

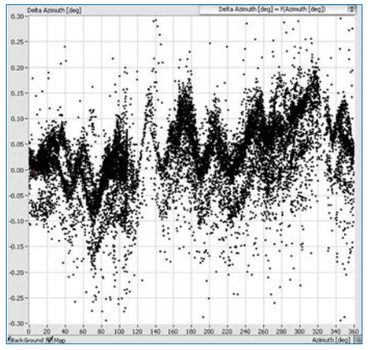
RES® presents a known reference environment to the radar on RF level. The simulated environment can include up to 2000 SSR or Mode-S targets, ADS-B, FRUIT, reflectors and antenna behavior. It allows a full data link to be tested to its extreme performance limits.

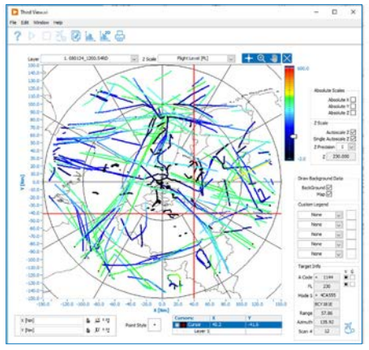
RES® speeds up factory and site acceptance testing through generating simulated scenarios which are impossible to achieve with common signal generators. Repeatability of tests is a valuable time- and cost-saving advantage. RES® avoids dependency of opportunity traffic and test flights, as such increasing reliability and test repeatability and reducing cost and environmental impact.

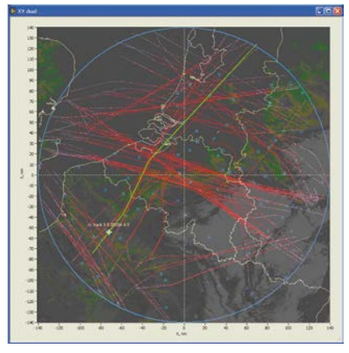


RTG – Radar Target Generation for PSR

The Radar Target Generator (RTG) simulates targets on-site or in-factory at RF level. Those generated RF signals can be injected in the receiver directly or transmitted in the field. RTG scenarios can be used on top of the real clutter background, interferences, and opportunity traffic, or they can be integrated in a lab test environment. It allows to evaluate radar KPI's and simulate complex scenarios.







SKYRF®

Drone measurements for CNS performance evaluation

SkyRF® is the drone platform for measurement services for performance analysis on Communication, Navigation and Surveillance (CNS) installations. It's offered under a preferred partnership between Intersoft Electronics Services and Skyguide.

The dedicated equipment onboard SkyRF® and the software platform were specifically designed for measuring navaids and radar performance in the far field. Measuring signals at elevation avoids urban interference and obstructions. Analyzing CNS performance was never before so easy, accurate and reliable. SkyRF® complements ground measurements and reduces the need for flight checks up to 50%.

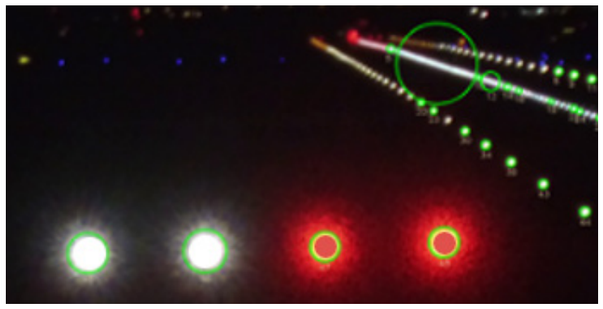
SkyRF® supports commissioning, certification and maintenance of primary & secondary radar and navaids including ILS, DME, TACAN, VOR and many other.

- Complete radar up- and downlink measurement, no need for checking multiple subassemblies individually
- Much lower operational impact, less downtime, less support from technicians or managers required compared to conventional flight test
- Instant, reliable and repeatable measurements, no estimates, no theoretic calculations but real measurements
- Live data streaming and monitoring
- Compliant to ICAO 8071, STANAG 3374, FAA 8200.1

PAPI Calibration

Conventional image processing techniques using light detection are employed. Images are transformed into binary images and subsequent filtering processes such as erosion and dilation are applied to easily detect bright spots.

Classic image processing techniques utilizing light detection are employed. Pictures are transformed into binary images, and subsequent filtering processes such as erosion and dilation are applied to easily detect light spots.



SkyRF

ILS – DME integrated measurements

SkyRF® assesses the performance of the ILS Localizer (LLZ) and the Glideslope (GS). To measure the LLZ, the drone flies a Mini-Orbit trajectory in the Far Field. For the GS profile, a Vertical trajectory is flown. The so called Mini-Approach test scenario flies the drone on the glidepath and allows to quickly measure both, LLZ and GS simultaneously. A Corkscrew scenario can be added and combined in a single flight to measure LLZ/GS and DME all at once.

Course, clearance, frequency and absolute power are measured through AM modulation of the 90/150 Hz signals. The difference in depth of modulation (DDM) is an indication of the exact position relative to the landing strip.

Vertical, Mini-Orbit and Mini-Approach trajectories for default maintenance procedure

VOR/TACAN – DME integrated measurements

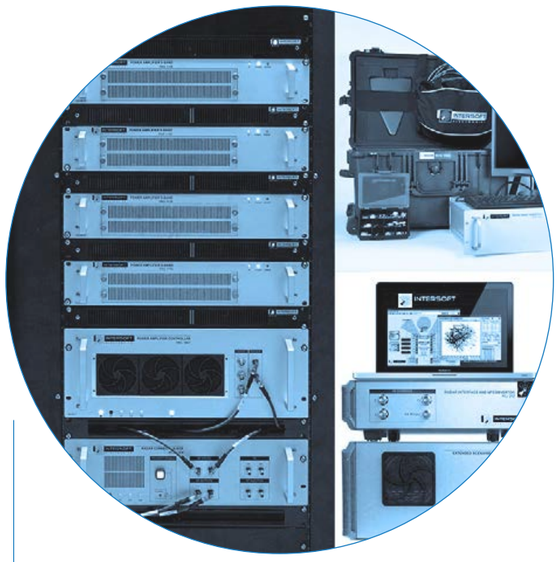
To analyse VOR performance, the same trajectories are used as for DME. This makes it possible to measure azimuth error, FM deviation, RF level and modulation depths of 30 Hz and 9960 Hz as a function of azimuth angle and distance. Trajectories are designed so that a thorough analysis of the cone of silence can be carried out. SkyRF® can serve military TACAN stations with the same range and accuracy (or better) as civilian navigation aids.

Radar VPD and HPD measurements

For radar systems using AESA (Active Electronically Scanned Array) antennas or conventional rotating antennas, it is important to perform HPD at different distances, azimuths and elevation angles. With SkyRF®, this can be achieved in a minimum of time, with great flexibility for PSR and SSR/IFF radar systems. For uplink measurements, no radar downtime is required.

VPD information can be measured flying vertically to the radar. SkyRF® compensates for slant range and terrain deviations to calculate the maximum power for each elevation angle relative to the radar system. The results are displayed live from the flight platform. VPD measurements can be performed for both PSR and SSR/IFF radar systems.

CORE ACTIVITIES

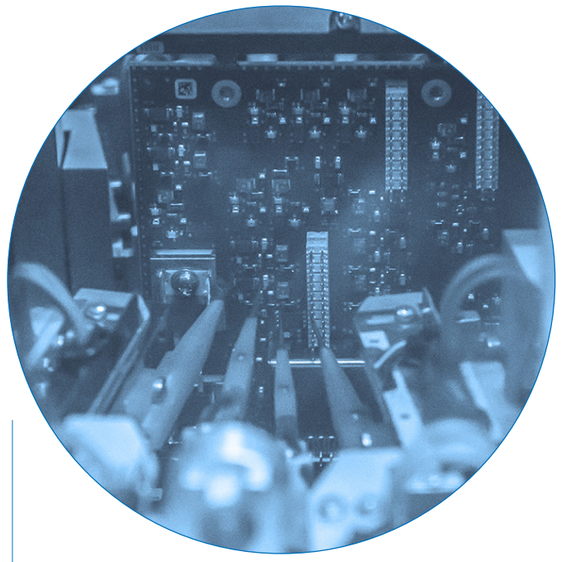


ELECTRONICS

We design and develop Radar subsystems and test equipment to measure Radar and CNS systems.

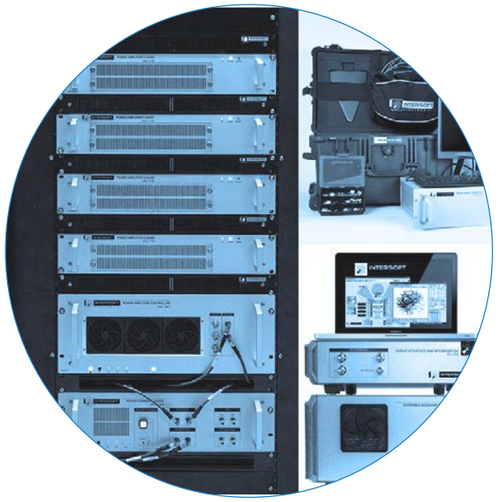
SERVICES

We deploy a global services organization with local representations to support ANSP’s, Military, MRO’s and Radar Manufacturers in installation, testing, certification and calibration.



MANUFACTURING

We manufacture RF electronics according to industry and military standards.



ELECTRONICS

TECHNOLOGIES

Intersoft Electronics designs and develops new radar technologies that are used in radar upgrades and in OEM system solutions.

All technologies improve sensor performance evaluation and solve emerging as well as long lasting challenges. S-ESAM® & L-IESA® are non-rotating antenna technologies that simplify antenna design, eliminating maintenance-intensive rotating parts.

VCC and other patented processing algorithms are the core technology of the Next Generation Signal Processor (NGSP®), addressing issues of clutter, windfarms, interference and 3D height information.

UPGRADES

NGSP® and NGTX are the core of many radar upgrade solutions. They are used in Service Life Extension Programs (SLEPs) and upgrade the performance of legacy radar to the state of the art.

That is a cost-effective way to mitigate emerging challenges such as 4G/5G interference and windfarms.

SYSTEM SOLUTIONS

ASR-M® is a modular air surveillance radar design that can be integrated with existing and newly built systems.
The radar operator benefits cutting edge detection performance and the manufacturer enjoys the smooth integration of a modular system.
The incremental upgrade of modules allows to keep pace with the changing air space environment and rapidly advancing technologies, without the need to replace systems entirely. As such, ASR-M® allows for an infinite lifecycle support.

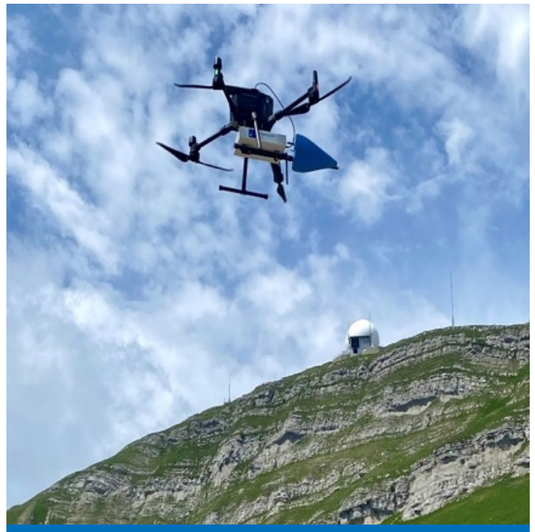
SERVICES

Intersoft Services has local branches worldwide to provide services and support on Communication, Navigation and Surveillance (CNS) systems. Our technicians are IFATSEA compliant.

PERFORMANCE EVALUATION

Performance evaluations on CNS are done on-site, in-the-field and using the SkyRF® drone platform.

SkyRF® features unique capabilities, reducing the need for test flights by up to 50%. It is used to validate NATO/AIMS interoperability and for certification measurements.

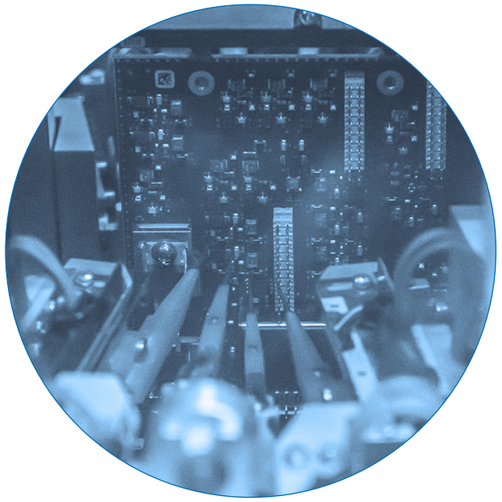


ANALYSIS & CALIBRATION

Intersoft Services also provides detailed system analysis and calibration, both in lab environments and in-the-field. Radar environment simulation (RES®) and radar target generation (RTG) are proven methods for thorough Radar Analysis.

SITE WORKS & TRAINING

Site works and training are integral parts of our business. We support in site installations and with the Intersoft Electronics Academy we provide external and internal technical trainings for every level of experience.

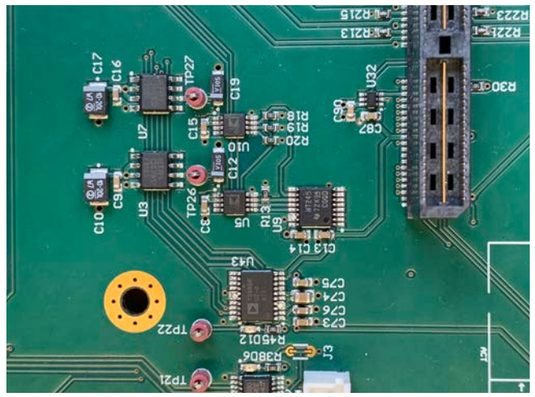


MANUFACTURING

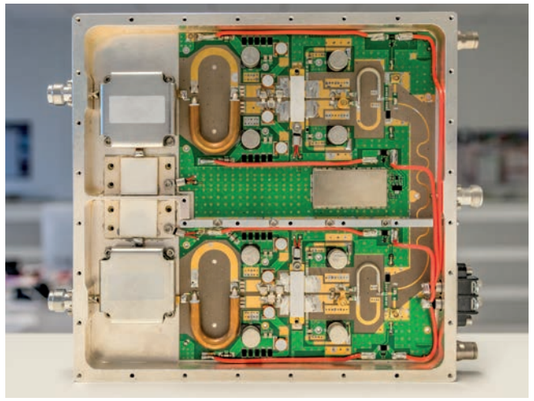
In our ISO certified facilities, we take care of manufacturing according to the requirements for civil aviation, defense, space and RF.
We have unique capabilities in the CNC milling of complex mechanical structures and provide high reliability PCB assembly and coating. Also sub assembly and system integration are executed to the highest QoS. Products and complete systems are tested against mandated industry and military standards.
Our manufacturing capabilities are fully vertically integrated, meaning that we support all the way from design to system testing. We offer rapid prototyping and fast product industrialization.

MECHANICAL

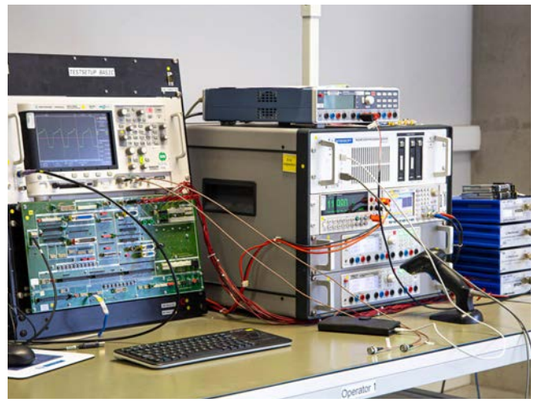
CIRCUIT BOARD



ASSEMBLY & INTEGRATION



TESTING & QUALIFICATION



CORPORATE FACTSHEET & HISTORY

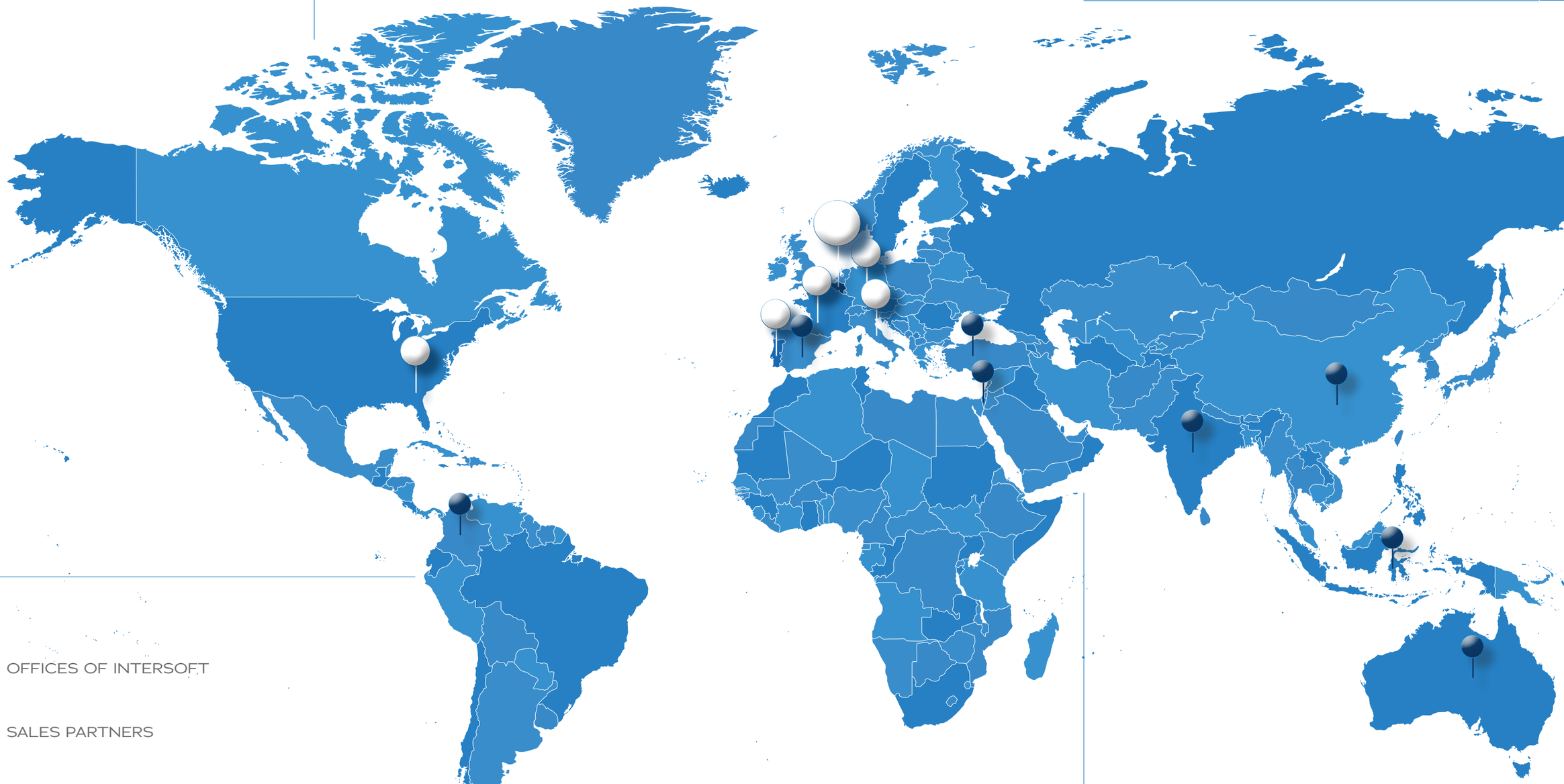
INTERSOFT
ELECTRONICS

40 YEARS

400 COLLEAGUES

20.000m² BUILDING

50.000m² LAND



OFFICES OF INTERSOFT

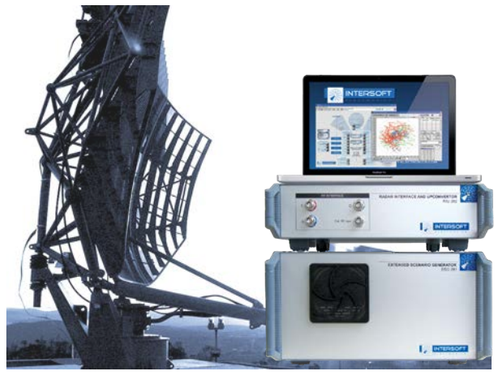
SALES PARTNERS

1990

RESEARCH & DEVELOPMENT

RADAR TEST EQUIPMENT

During the nineteen and early years 2000, Intersoft Electronics developed a broad portfolio of radar test equipment and monitoring tools known as RASS®. The Radar Environment Simulator (RES®) for SSR and Radar Target Generator (RTG) for PSR are two of the most successful products that are being used by ANSPs, military and manufacturers all over the world. Test equipment is still an important business for Intersoft Electronics, with SkyRF® drone measurements as the most recent addition to the services portfolio.



2000

USA BRANCH & WORLDWIDE REPRESENTATION

RADAR UPGRADES & SERVICE LIFE EXTENSION PROGRAMS

In the years 2000, Intersoft Electronics performed its first radar upgrade projects for the Belgian Air Force. More upgrades and service life extension programs on different types of radar all over the world followed soon. The Next Generation Signal Processor (NGSP®) was developed as a modular platform, incorporating advanced, patented algorithms, significantly improving detection performance.

2010

EXPANDING PRODUCTION FACILITIES

GLOBAL SERVICES ORGANISATION WITH LOCAL BRANCHES

MODULAR AIRPORT SURVEILLANCE RADAR

The NGSP® platform was the basis for ASR-M®, the modular solution for airport surveillance radar. The modular design addresses radar manufacturer's challenges of system lifetime support. By approaching system replacement in a modular manner, it becomes possible to keep a system up to date with state-of-the-art technologies that respond to the changing environments of the National Air Space.

2020

NON-ROTATING ANTENNA TECHNOLOGIES

Non-rotating antenna technologies are the most recent development of Intersoft Electronics, with patents pending. Non-rotating antenna systems for naval applications have reached TRL 9 and modular, non-rotating solutions for ASR are being demonstrated.

Over its 4 decades of existence, Intersoft Electronics has adapted itself to the businesses it entered. Its pedigree as an R&D and engineering company has been strengthened consistently. Production facilities have been expanded accordingly, and a global services organization with local branches has been established. Intersoft Electronics is growing fast organically and through strategic M&A.

ON YOUR RADAR

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Together we make the sky safer